APPENDIX 11—WATER QUALITY WITHIN THE RMPPA AND RIVER SYSTEM DEPLETIONS

The State of Wyoming recently issued a summary report for threatened or impaired water bodies, below are excerpts and summaries for areas within the Rawlins Field Office (RFO) (Wyoming 2003). This assessment was done to meet requirements of Section 305(b) and 303(d) of the Clean Water Act. Wyoming uses a publicly reviewed methodology to prepare the document, which meets the requirements of the "credible data" law. To see the current list of water bodies in the Resource Management Plan Planning Area (RMPPA) on the threatened or impaired list in this draft report (see Table A11-1).

DESCRIPTION OF SUB-BASINS IN THE RFO

This section draws heavily from the Wyoming description of these basins (Wyoming 2003) and also contains local information from the Rawlins BLM on conditions and management practices that reflect current conditions. The reader should be aware that these descriptions are as current as possible for 2004 and most likely will not be accurate for the future. These are presented to give the reader an impression of typical water quality conditions in the RMPPA.

Muddy Creek Sub-basin (HUC 14050004)

Muddy Creek below Littlefield Creek and McKinney Creek below Eagle Creek are listed on Table C of the 303(d) List because of threats from physical degradation of the stream channels and riparian areas (See Table A11-1). The Little Snake River Conservation District (LSRCD) has had several 319 watershed improvement projects in the Upper Muddy Creek drainage to address those threats. The RFO has participated in these projects by working with permittees to address grazing management issues and vegetation management on BLM lands.

Implementation measures include upland water development, cross-fencing, vegetation management, and grazing management. These projects resulted in considerable improvement to stream stability, aquatic habitat, and riparian areas. As a result, Muddy Creek and Littlefield Creek above their confluence and McKinney Creek above Eagle Creek are now meeting their aquatic life uses. Because of the improved water quality, Colorado River Cutthroat Trout have been reintroduced into their former habitat in Littlefield Creek.

McKinney Creek and portions of Muddy Creek are still being monitored in cooperation with the LSRCD and grazing practices are being evaluated to improve these reaches. McKinney Creek still lacks the woody component in the riparian area, has too many bare banks, needs improvement in the width/depth ratios, and the season of use on the herbaceous component of these systems is too long. Efforts will continue to be made to improve the ecological health of these systems.

Another project was implemented on the reach of Muddy Creek, lying west of Highway 789, to address physical degradation of the stream channel, which threatens its aquatic life use support. This reach of Muddy Creek is also on Table C of the 303(d) List. Implementation measures include wetland development, floodplain reestablishment, and irrigation water management. Results of this project show an improving trend in riparian condition and bank stability above Red Wash. However, habitat degradation has been identified by the BLM and LSRCD as a serious water quality concern on Muddy Creek, from Red Wash downstream to the Little Snake River. The habitat degradation is likely caused by season-long riparian grazing, exacerbated by accelerated erosion associated with oil and gas activities.

Several grazing best management practices (BMPs) are being implemented in much of this lower watershed, including changes in length, timing, and duration of grazing and cross-fencing. However, projected increases in Coalbed Natural Gas development will lead to increased surface disturbance and possible increased erosion and sediment loading.

Little Snake Sub-basin (HUC 14050003)

Haggarty Creek is the site of an inactive copper mine, the Ferris-Haggarty/Osceola Tunnel, which dates from 1898. Haggarty Creek originates near the Continental Divide and confluences with Lost Creek to form West Fork Battle Creek. Haggarty Creek has been on former 303(d) lists because of metal exceedences (primarily copper with less toxic amounts of silver and cadmium) discharging from the Ferris-Haggarty Mine. The Department of Environmental Quality-Abandoned Mine Lands (AML) Program has funded a remediation project to treat the effluent and a proposed total maximum daily load (TMDL) has been sent to the Environmental Protection Agency (EPA). Review of data during the TMDL process on Haggarty Creek revealed that copper criteria are also exceeded on the West Fork of Battle Creek, downstream of Haggarty Creek, so this stream was added to Table A of the 303(d) List. The treatment of the Ferris-Haggarty/Osceola Tunnel effluent is thought to be more than adequate to allow the West Fork of Battle Creek to meet standards.

The Department of Environmental Quality (DEQ) has monitored water quality in the Little Snake watershed, which indicates that aquatic life uses are fully supported on the portions of the Savery Creek and North Fork Little Snake drainages within the Medicine Bow National Forest and much of the upper watershed of Little Savery Creek. However, physical degradation of lower Savery Creek and West Loco Creek is threatening full aquatic life use support, and these streams are on Table C of the 303(d) List. Currently, a 319 watershed improvement project is in place in the lower Savery Creek drainage to address those threats.

Upper North Platte Sub-basin (HUC 10180002)

The Upper North Platte Sub-basin is that area upstream of Seminoe Reservoir to the Colorado Line. In the upper portion of this sub-basin, like most of the high-elevation basins in Wyoming, most of the bottomlands are privately owned and irrigated for hay production. Generally, the uplands are grazed at lower elevations primarily early and late in the year, and the higher elevations are grazed in the summer. Much of the forested area was historically harvested for railroad ties, and many of the larger mountain streams were straightened and logs and boulders were removed to facilitate tie driving. There is some oil and gas production in the sub-basin, and Sinclair has an oil refinery. There are no large-scale mining operations, but historically there has been considerable gold and copper mining in both the Sierra Madre and Medicine Bow mountains. DEQ's Abandoned Mine Lands Division (AML) has funded restoration projects in many of the mining areas within the sub-basin.

Iron oxide was mined near Rawlins for use primarily as a paint pigment and has been applied on barns across the country. There has also been some limited coal mining in this basin, and gravel mines are scattered throughout.

Stream bank modification within the town limits of Saratoga, intended to reduce erosion, resulted in increased erosion in several other places as the river adjusted its channel. However, recent stabilization has been conducted with natural river processes in mind, which should reduce erosion. Natural hot springs in and near Saratoga slightly increase the temperature and dissolved solids content of the river.

Encampment River Watershed (HUC 1018000205)

The Encampment River originates in the Mt. Zirkel Wilderness area in Colorado before it flows into Wyoming. Within a couple miles it flows into the Encampment River Wilderness Area. Flows are augmented in this drainage as a result of a trans-basin diversion of water from the Little Snake drainage into Hog Park Reservoir for replenishing the North Platte water that Cheyenne diverts out of Douglas Creek. The increased flows in Hog Park Creek did reportedly cause some initial channel adjustment after the reservoir was completed in 1965, but the stream appears to be stabilizing. South Hog Park Creek was tie driven and carried a large sediment load and was unstable, so tree revetments were installed to help the stream establish a more natural shape and to improve the fishery. But beaver were removing the revetments for dam building because dams built with the small available willows could not withstand high spring runoff. Aspens are now being cut and hauled to the beaver so they will use the aspens instead of the revetments, so both can work to trap the sediment and restore the stream.

A diversion ditch in the Billie Creek drainage breached in the late 1990s, eroded a gully and deposited approximately 3,300 tons of sediment in Billie Creek and its flood plain. Restoration work of the gully was completed in 2001 to curtail erosion; however, recovery from the impacts to the stream and its aquatic life will likely take several years.

A 1984–86 AML remediation project removed a large (approximately 65,000 cubic yards) tailings pile generated by the mill and smelter in Encampment during the early 1900s, which reportedly resulted in considerable water quality improvement in the river. DEQ has conducted extensive monitoring in the drainage, and the majority of the stream miles are fully supporting their aquatic life uses.

Sage Creek Watershed (HUC 1018000209)

Sage Creek has a naturally high sediment load because of the highly erosive soils and arid climate in much of the watershed. It has been identified by several studies as the most significant contributor of sediment to the Upper North Platte River and is on Table C of the 303(d) List. In addition, dam failures, road building, and past grazing practices have resulted in increased erosion and sediment loading, especially from the lower portion of the watershed. In 1997, Saratoga-Encampment-Rawlins Conservation District (SERCD), in cooperation with landowners, BLM, the Natural Resources Conservation Service (NRCS), and the Wyoming Game and Fish Department (WGFD), began the Sage Creek Watershed 319 project.

The project is using a combination of short-duration grazing, off-channel water development, improved road management, grade control structures and water diversion and vegetation filtering to reduce sediment loading from Sage Creek to the North Platte, as well as improving water quality within Sage Creek. Data collected as part of the project already show reduced sediment loading to the North Platte River and improved riparian and range condition.

Hugus and Iron Springs Draw drainages are Class 3B waters, with intermittent to ephemeral stream channels. Although historically impacted by past grazing practices, existing information and data indicate no significant water quality problems. In addition, new and developing Allotment Management Plans (AMPs) are expected to result in even better watershed condition. Sugar Creek flows through Rawlins and enters the North Platte just upstream of Seminoe Reservoir. Some concerns with the physical condition of the watershed above Rawlins have been raised. Rawlins' wastewater treatment plant discharges to Sugar Creek, but the stream rarely flows all the way to its confluence with the North Platte River.

Pathfinder-Seminoe Sub-basin (HUC 10180003)

In the Pathfinder-Seminoe Sub-basin, North Platte River flow is regulated by Seminoe, Kortes, and Pathfinder Reservoirs. The sub-basin includes those areas, other than the Sweetwater and Medicine Bow Rivers, which drain into the North Platte River, or its reservoirs, between Pathfinder dam and the head of Seminoe Reservoir. Primary land uses in this sub-basin are ranching, irrigated hay production, coal mining and recreation. Underground coal mining began in the Hanna-Elmo area in the late 1860s to supply fuel for the transcontinental railroad and resulted in extensive underground coal workings created over a period of years. AML completed three remediation projects in the Hanna area, which corrected the erosion and standing water impacts associated with coal slag piles and almost 200 coal mine-related subsidence holes. Current coal mining activities are thought to have little impact on the water quality in this sub-basin or the Medicine Bow Sub-basin (HUC 10180004).

Pathfinder dam was completed in 1909 and provided the first regulation of flows on the river. Reservoirs also trap sediment and lower average water temperature, so the natural flow characteristics of the North Platte have not existed since then. An extremely productive tailwater fishery resulted after Seminoe Dam was completed in 1939 and was given the name Miracle Mile. Completion of Kortes Reservoir below Seminoe Dam shortened the Miracle Mile area, but with the establishment of instream flow rights, it is still considered a premiere blue ribbon fishery.

Deweese Creek, which flows into Pathfinder Reservoir, is one of the few perennial streams in this sub-basin and is considered a reference stream for sand bottom streams in the Wyoming Basin Ecoregion.

Medicine Bow Sub-basin (HUC 10180004)

The headwaters of the Medicine Bow Sub-basin are on the north slope of the Snowy Range. Water quality characteristics change drastically as the streams flow from the metamorphic geology of the mountains through the easily erodible, fine-grained sedimentary geology of the basin. This sub-basin drains into Seminoe Reservoir. Land uses include logging in the mountains, grazing, irrigated hay production, recreation, coal mining, and oil and gas development. Irrigation in the Medicine Bow River drainage (including Rock Creek) dates to at least 1870–1880, the time of railroad construction. The transcontinental railroad reached this area in 1868, and coal production began in 1869 near Carbon to supply fuel for the railroad.

AML has completed 10 site investigations in this sub-basin, most related to coal and gravel production, and completed remediation of one early 1900s coal mine. Water quality assessments conducted in the upper Medicine Bow River drainage above the town of Elk Mountain indicate full support of aquatic life uses. Extensive monitoring by DEQ, as well as several agencies and universities, also indicate full aquatic life use support in the Rock Creek drainage above McFadden. The Medicine Bow Conservation District has conducted considerable monitoring in the lower portion of this sub-basin, and the final data interpretation is pending.

Little Medicine Bow Sub-basin (HUC 10180005)

The Little Medicine Bow Sub-basin drains the northwestern edge of the Laramie Mountains and the Shirley Basin. Land uses are primarily ranching and oil and gas development, together with historic uranium mining (1955 to the early 1980s). AML completed reclamation of about 1,650 acres of open pit uranium mines in Shirley Basin.

The Little Medicine Bow River originally flowed through the uranium ore location. During mining operations in 1972, the river was diverted to the east and shortened. The unstable new channel had down cut as much as 50 feet and drastically increased the sediment input to the drainage system. During reclamation, the river channel was restored to its former location and pre-mining condition, with stabilized, revegetated banks and a revegetated riparian area. Eroding radioactive mine waste piles, which also contained elevated levels of selenium and heavy metals, were removed. Leaching and runoff water from these waste piles had been impacting surface and groundwater quality. Reclamation improved water quality and reduced off-site sediment transport.

Upper Laramie Sub-basin (HUC10180010)

This sub-basin includes all the drainages above Wheatland Reservoir #2. Major drainages in the Upper Laramie Sub-basin are the Laramie and Little Laramie Rivers whose headwaters are in the Medicine Bow Mountains. Land uses are logging, recreation, and grazing at higher elevations; grazing, irrigated hay production, and some oil and gas development in the lower elevations.

Table A11-1. Impaired or Threatened Water Bodies Located within the RMPPA

Wyoming Draft 2004 303(d) List of Waters: List of Impaired or Threatened Water Bodies Located within the RMPPA[1]							
Basin	**HUC**	**Name**	**Location**	**Cause of Impairment**	**Source**	**Uses Impaired**	**Date Listed**
Water Bodies with Water Quality Impairments (Excerpts from Table A)							
Little Snake	14050003	Battle Creek, West Fork	From Battle Crk. To Haggarty Crk.	Copper	Point, Natural	Cold Fish, Aquatic Life	2000
Little Snake	14050003	Haggarty Creek	From Ferris-Haggarty Mine to West Fork Battle Crk.	Silver, Copper, Cadmium	Point, Natural	Cold Fish, Aquatic Life	1996
South Platte	10190009	Crow Creek	Impairment undetermined distance above and below Cheyenne.	Ammonia, Fecal Coliform	Non-point Undetermined	Fisheries, Aquatic Life, and Contact Recreation	1996
South Platte	10190009	Middle Crow Creek	Exceedences measured at FS Road 700. Impairment thought to be limited to grazing allotment pasture.	Fecal Coliform	Non-point Undetermined	Contact Recreation	2004
Water Bodies with Water Quality Threats (Excerpts from Table C)							
Little Snake	14050003	Loco Creek, West Fork	All of West Fork Watershed above Loco Creek.	Habitat Deg., Nut., Temp.	Non-point	Cold Fish, Aquatic Life	1996
Little Snake	14050003	Savery Creek	Below Little Sandstone Creek to Little Snake River.	Habitat Degradation	Non-point	Cold Fish, Aquatic Life	1998
Little Snake	14050004	McKinney Creek	Above Muddy Creek to Eagle Creek.	Habitat Degradation	Non-point	Cold Fish, Aquatic Life	1996
Little Snake	14050004	Muddy Creek	West of State Hwy. 789.	Habitat Degradation	Non-point	Cold Fish, Aquatic Life	1996
Little Snake	14050004	Muddy Creek	Above Alamosa Gulch to Littlefield Creek.	Habitat Degradation	Non-point	Cold Fish, Aquatic Life	1996
Little Snake	14050004	Sage Creek	From confluence with North Platte River to State Hwy. 71.	Habitat Degradation	Non-point	Cold Fish, Aquatic Life	1996

[1]*Downloaded from http://deq.state.wy.us/wqd/events.asp in February 2004.*

DEPLETIONS TO RIVER SYSTEMS RESULTING FROM BLM-APPROVED ACTIVITIES

Depletions are the amount of water in a river system that is unavailable to fish, plant, or wildlife species as a result of water development or use. This is typically calculated based on a monthly mass balance calculation and therefore can include water that is stored in headwaters and/or water lost through consumptive use or evaporation. The Colorado River System has regional management plans and a recovery program, which began in 1988, to address depletions (Roehm 2003). The Platte River has interim policy guidance and a method for accounting for depletions. An EIS for the cooperative agreement for a recovery program is in draft form (USBOR and USFWS 2004). Because the Great Divide Basin is a closed basin with internal drainage, there are no impacts to river systems with threatened or endangered species requiring consideration of depletions resulting from BLM management actions.

The RFO participates in management plans and the recovery program for the Colorado River as well as the interim policy in the Platte River Basin. Any BLM-approved project that results in a federal nexus (requiring federal approval because of the use of federal resources including minerals or land use) that may result in depletion to these systems would be addressed during the National Environmental Protection Agency (NEPA) analysis for that particular project. If required the BLM will consult with the U.S. Fish and Wildlife Service (USFWS) on these depletions and potential impacts to protected species.

Colorado River System

A Biological Opinion (BO) was issued in 2000 to cover Colorado River depletions from livestock watering facilities. It was determined that individual projects causing 100 acre-ft or less of average annual depletion would be included in a programmatic approach and projects greater than 100 acre-ft would still be individually consulted on (USFWS 2000). The recovery program was established in 1988 based on the needs of the endangered Colorado pikeminnow (*Ptychocheilus lucius*), endangered humpback chub (*Gila cypha*), endangered bonytail (*Gila elegans*), endangered razorback sucker (*Xyrauchen texanus*), and designated critical habitat for these fish.

A management plan for the Yampa River basin is currently in draft form (Roehm 2003). This plan quantifies current depletions as well as projects depletion through 2045. This is a joint effort between Wyoming and Colorado to account for water development projects that lead to depletions. As projects occur on BLM land or need right-of-way (ROW) actions across BLM land, they will be evaluated to consider adequacy under the plan if it is adopted. Most of the projects mentioned in the Yampa River Management Plan will be initiated by the State of Wyoming and/or local water conservancy districts.

Depletions from other activities such as oil and gas development are handled for individual projects and considered during the NEPA process. Water is used for drilling operations, hydrostatic testing of pipelines, and dust abatement. The source of this water can vary but direct withdrawals from surface waters are generally not allowed for these uses. Common potential sources include municipalities (Baggs, Wyoming) or state-approved wells. If it is determined that these sources are tributaries to the surface waters in question, depletions would be consulted on with the USFWS. Produced water during oil and gas activities is evaluated during the NEPA process to determine potential connections between the producing geologic formation and surface waters. Methods for making this determination can include isotopic analysis, water quality data, and/or groundwater modeling.

Platte River System

The species of concern in the Platte River system are the whooping crane, least tern, piping plover, and pallid sturgeon. A programmatic approach was developed to protect the hydrology required to maintain critical habitat for these species in Nebraska (BLM 1999). This programmatic approach addressed small depletions of less than 25 acre-feet per year. A fund was set up to account for these small depletions. For larger depletions, an individual consultation is required.

Water development in the Platte River Basin is less common because of fully appropriated water rights in most of the basin. Most of the irrigated agriculture that is near RFO BLM administered lands is in this basin, and this system has two large reservoirs (Seminoe and Pathfinder) that regulate flows of the North Platte and store water for municipal and agricultural use. There is at least one transbasin diversion from the Colorado River system to the Platte river system in Wyoming to meet municipal water uses in Cheyenne.

Oil and gas activities and mineral development (specifically coal mining and natural gas extraction from coals) typically dewater geologic formations to extract resources. In the Platte River system, this will add non-tributary water from these formations to the Platte River system. Reasonably foreseeable development includes the discharge of significant amounts of water into the Platte River system. Although some anticipated actions have not been approved, some of this non-tributary water may be available to meet species needs downstream.

All non-tributary water added to the system needs to be accurately measured to be used to meet species needs and would be discharged above Seminoe and Pathfinder reservoirs and therefore managed for this use by reservoirs along the North Platte. All water discharged must be approved by the State of Wyoming under its National Pollutant Discharge Elimination System (NPDES) Program (http://deq.state.wy.us/wqd/pointsources.asp, accessed 2003). This program requires that water quality not be degraded below numerical requirements for beneficial uses specified for the water bodies receiving the discharges or located below the discharges. Seminoe Reservoir and the North Platte River are water quality classification 2AB, which is the highest numerical standard and is protected for game fish and drinking water. Portions of the North Platte River (Miracle Mile and the headwaters) are considered class 1 waters; this means that the water quality cannot be degraded by point source discharges.

Depletions from activities such as oil and gas development are handled for individual projects and considered during the NEPA process. Water is used for drilling operations, hydrostatic testing of pipelines, and dust abatement. The source of this water can vary but direct withdrawals from surface waters are not allowed for these uses. Water produced during oil and gas activities is evaluated during the NEPA process to determine potential connections between the producing formation and surface waters. Methods for making this determination can include isotopic analysis, water quality data, and/or groundwater modeling.

For projects involving large amounts of groundwater, groundwater modeling considering geology and any data available from local wells will be used to evaluate impacts, including surface waters. Isotopic analysis can be used to determine when water was deposited in groundwater formations and whether the waters are tributary to surface waters. Water quality data along with water pressure can be used to evaluate the homogeneity of groundwaters in formations and to confirm or deny assumptions made by the other methods. A combination of these approaches depending on the scale or likelihood of the potential connection to surface waters will be used to determine if groundwater is tributary. If groundwater use is from tributary systems, it will be considered a depletion and consultation will occur with the USFWS.

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